forming machine operators wear protective shoes and clothing, when working with certain chemical compounds.

Most textile machinery operators work a standard 40-hour week. Night and weekend shifts are common, because many textile and fiber mills operate 24 hours a day. Employers often use a rotating schedule of shifts, however, so operators do not consistently work nights or weekends.

Employment

Textile machinery operators held about 277,000 jobs in 1998. Most of these workers were employed in weaving, finishing, yarn, and thread mills; but knitting mills and manufactured fiber producers also employed a significant share. Most extruding and forming machine operators were employed in chemical plants.

North Carolina, Georgia, and South Carolina were the leading States in the employment of textile workers. Most of the remaining workers were employed in other southern States, California, and the Northeast.

Training, Other Qualifications, and Advancement

Although not required for all machine-operating positions, a high school diploma or its equivalent is becoming common for entry-level positions in many mills. Some mills prefer applicants to possess a high school diploma and additional technical training. This training may be obtained, in part, at a formal training institution, such as a technical school. Experienced workers or representatives of machinery manufacturers may offer extensive on-the-job training.

As the textile industry becomes more highly automated, some operators will need to understand complex machinery and be able to diagnose problems. Because textile machinery is increasingly controlled electronically, jobseekers will benefit from a basic knowledge of computers and electronics.

Physical stamina and manual dexterity are important attributes for these jobs. In addition, self-direction and interpersonal skills are becoming important for textile machinery operators, as organizational changes that promote teamwork and encourage few levels of management are leading operators to assume increasing responsibility and to take initiative.

Textile machinery operators can advance in several ways. Some workers become instructors and train new employees. Others advance by taking positions requiring additional skills and increased responsibility. A number of experienced operators are promoted to first-line supervisory positions.

Job Outlook

Employment of textile machinery operators is expected to decline over the 1998-2008 period. The most important factors influencing the employment outlook will be increased worker productivity through the introduction of laborsaving machinery and an open trading environment. In spite of the projected decline, many openings will be created annually, as workers change occupations or leave the labor force. Because the textile industry is highly automated, persons with technical skills and some computer training will have the best opportunities.

Employment is expected to decline, as textile firms respond to growing competition in coming years by investing in new equipment, reorganizing work practices, and consolidating. New machinery, such as faster air jet looms and computer-integrated manufacturing technology, will increase productivity and allow each operator to monitor a large number of machines. Many factories are also reorganizing production floors to further increase productivity and to give workers additional responsibility. Also, textile firms are merging to benefit from economies of scale and to pool resources to invest in new equipment. Although each of the above practices should make the textile industry increasingly competitive, these practices will adversely affect the employment outlook for many machine operators.

Another major uncertainty for textile workers is the future of trade. Recent trade initiatives, like the North American Free Trade Agreement and the Agreement on Textiles and Clothing of the World Trade Organization, will help to open export markets for textiles produced in the United States. At the same time, they will dismantle much of the protection that has been provided to the industry for decades, leading to more textile imports and relocation of textile mills to other countries. While the textile industry will be able to compete in many product lines, the labor-intensive U.S. apparel industry will be more adversely affected by these trade initiatives. This, in turn, will negatively affect the demand for textile machinery operators, because the apparel industry is the largest consumer of American-made textiles.

In contrast to other textile machine operating occupations, extruding machine operators, who produce synthetic fibers are expected to experience growing employment in coming years. Because this occupation is small, however, growth is projected to create only a small number of new openings.

Earnings

Median hourly earnings of textile draw-out and winding machine operators, who account for about two-thirds of textile machinery operators, were $9.37 in 1998. The middle 50 percent earned between $7.84 and $10.62. The lowest 10 percent had earnings of less than $6.61, whereas the top 10 percent earned over $12.20.

Median hourly earnings for other textile machinery operators in 1998 were $13.43 for extruding and forming machine operators, $10.40 for textile machine setters and set-up operators, and $9.31 for textile bleaching and dyeing machine operators. In general, earnings vary significantly, depending on the type of mill, job specialty, shift, and seniority. In addition to typical benefits, some firms provide on-site daycare facilities, educational benefits, and employee discounts in company-owned outlet stores.

Related Occupations

Metalworking and plastics-working machine operators perform similar duties and have many of the same entry and training requirements as extruding and forming machine operators and tenders, textile machine operators and tenders, and textile bleaching and dyeing machine operators. Setters and setup operators in other industries—metal fabrication and plastics manufacturing, for example—perform duties comparable to those of textile machine setters and setup operators.

Sources of Additional Information

Information about job opportunities in textile and synthetic fiber production is available from local employers and local offices of the State employment service.

For general information on careers, technology, and trade regulations in the textile industry, contact:

☛ American Textile Manufacturers Institute, Inc., 1130 Connecticut Ave. NW., Suite 1200, Washington, DC 20036-3954. Internet: **http://www.atmi.org**

☛ Institute of Textile Technology, 2551 Ivy Rd., Charlottesville, NC 22903-4614. Internet: **http://www.itt.edu**

Upholsterers

(O*NET 89508)

Significant Points

- About 1 out of 3 is self-employed—triple the average for all craft workers.
- Most upholsterers gain experience through on-the-job training.
- Opportunities for experienced upholsterers should be good, because few people enter the occupation and few shops offer training.

Nature of the Work

Upholsterers make our lives more comfortable and aesthetically pleasing by adding upholstery to new furniture and renewing existing upholstered furniture. In addition, some upholsterers repair or replace automobile upholstery and convertible and vinyl tops. In either case, these workers need an extensive knowledge of fabrics, materials, and upholstery techniques.

Although the many fabrics and other materials used in an upholstered product have changed considerably over time, the basic process of constructing and assembling a piece of furniture has remained much the same. This process always starts with the frame. For both new and reconditioned pieces of upholstered furniture, the upholsterer examines the frame for wood defects, loose sections, and finish. Upholsterers may make minor repairs, such as regluing or refinishing, but major repairs, such as modifications to etched or intricate items, are typically referred to a general furniture repairer or a highly skilled craftsperson.

When restoring a piece, upholsterers first discard the old, worn coverings by using a hammer or tack puller to remove staples, tacks, or other fasteners. Worn sections of padding are then removed, but upholsterers try to reuse as much of the padding as possible, to preserve the shape of the item. After removing all materials and exposing the bare frame, the upholsterer examines the frame for bent and broken springs, repairing or replacing old ones, as necessary. The webbing, which is a strong cloth mat that holds the springs, is also checked for wear. If it is too weak to hold the springs properly and support the upholstered sections, new webbing is installed. Upholsterers do this by tightly stretching the webbing (typically made of nylon, jute, or cotton) from one side of the frame to the other, securely tacking it on both ends. Additional webbing is layered onto the first and attached to the frame forming a new mat.

The upholsterer then positions the springs, either sinuous-wire or hand-tied coils, on the mat, so they conform to it and compress evenly. The coils are then sewn or stapled to the mat or frame and tied to each other. Burlap or a pad of compressed fiber is stretched over the springs to hold their shape, then cut, smoothed, and tacked to the frame. The next step is preparing the frame with cardboard to fill in open areas or give curve to the frame. Upholsterers then cover the springs with filler, such as foam or a polyester batt or similar fibrous batting material, to form a smooth, rounded surface.

Upholsterers also measure and cut fabric for arms, backs, and other furniture sections, leaving as little waste as possible. Using a basting stitch, fabric pieces are sewn together, to ensure a tight, smooth fit. The cover is removed, and any necessary adjustments are made. The final upholstered item is sewn together and tacked, stapled, or glued to the frame. Finally, upholsterers attach any ornaments, such as fringes, buttons, or rivets.

When performing these tasks, upholsterers use common hand tools, such as tack hammers, staple guns, tack and staple removers, pliers, and shears. They also employ specialized equipment like webbing stretchers and upholstery needles. In addition, most upholsterers use sewing machines.

Upholsterers involved in custom work must be highly skilled.

The nature of an upholsterer's work often varies with work setting. Those who produce new furniture in factories typically perform a limited range of skilled, often repetitive, tasks. Upholsterers doing reupholstery or custom work, however, perform a broader range of highly skilled upholstery tasks. In addition to other tasks, upholsterers who work in upholstery shops may pick up and deliver furniture or help customers select new coverings. Those who manage shops also order supplies and equipment and keep business records.

Working Conditions

Most upholsterers work in a shop or factory. Working conditions in these facilities typically vary according to size. Although many shops and factories are spacious, have adequate lighting, and are well ventilated and heated, some may be cramped and dusty.

Upholstery work is not dangerous, but upholsterers usually wear protective gloves and clothing when using sharp tools and lifting and handling furniture or springs. Upholsterers stand most of the workday and may do a lot of bending and heavy lifting. They also may work in awkward positions for short periods of time.

Employment

Furniture upholsterers held about 66,000 jobs in 1998. About 1 out of 3 was self-employed—triple the average for all craft workers. Companies that manufacture furniture and shops that reupholster and repair furniture employed most upholsters. Others worked in shops specializing in reupholstering the seats of automobiles and other vehicles.

Training, Other Qualifications, and Advancement

Most upholsterers gain the skills necessary to become an experienced worker through on-the-job training. In a furniture factory, this training usually lasts about 6 weeks, but it may be supplemented by an additional 3 years of training, to become fully qualified in skilled production work. It may take as many as 8 to 10 years of experience and progressively more difficult work, however, for an upholsterer to reach the top of the trade. Generally, these highly skilled upholsterers work on custom-made and re-upholstered pieces at the high end of the market.

When hiring helpers, employers generally prefer people with some knowledge of the trade. Inexperienced persons may receive basic training in upholstery in high school, vocational and technical schools, and some community colleges. These programs include sewing machine operation, measuring, cutting, springing, frame repair, tufting, and channeling, as well as business and interior design courses. Additional training and experience are usually required, before graduates become fully proficient in their trade.

Upholsterers should have manual dexterity, good coordination, and, in some cases, the strength needed to lift heavy furniture. An eye for detail, a flair for color, and a creative use of fabrics also are helpful.

The primary forms of advancement for upholsterers are opening their own shop or moving into management. It is relatively easy to open a shop, because a small investment in hand tools and a sewing machine are all that is needed. The upholstery business is extremely competitive, however, so operating a shop successfully is difficult. In large shops and factories, experienced or highly skilled upholsterers may become supervisors or sample makers.

Job Outlook

Job opportunities for experienced upholsterers should be good. The number of upholsterers with experience is limited, because few young people enter the occupation and few shops offer training.

Little or no change in the employment of upholsterers is expected through 2008. The increasing manufacture of new, relatively inexpensive upholstered furniture is expected to reduce the demand for

reupholstery, solidifying employment at the current level. Nevertheless, a steady demand will continue to exist for upholsterers to restore very valuable furniture. Unlike many other production occupations, automation is not expected to reduce employment opportunities substantially in this occupation, because most upholstery work is labor-intensive and is not easily automated.

Employment of upholsterers in automobile repair has been declining for some time, although the rate of decline should slow. The widespread use of more durable fabrics for automobile seat covers, soft-tops, and convertibles is responsible, in part, for the loss of workers in this industry. This decline may be partially offset in coming years by the reemergence of the luxury automobile, especially those with leather upholstery and convertible tops. Despite little or no change in overall employment of upholsterers, job openings should arise from the need to replace experienced workers who transfer to other occupations or leave the labor force.

Earnings

Median annual earnings of upholsterers were $22,050 in 1998; the middle 50 percent earned between $17,800 and $26,920. The lowest 10 percent earned less than $14,160, while the top 10 percent earned over $33,150. Median annual earnings in the household furniture industry were $21,300, and workers performing reupholstery and furniture repair received a median annual salary of $22,500 in 1997. Earnings of self-employed upholsterers depend on the size and location of the shop and on the number of hours worked.

Related Occupations

Other workers who combine manual skills and knowledge of materials such as fabrics and wood are fur cutters, furniture finishers, pattern and model makers, and casket coverers.

Sources of Additional Information

For details about work opportunities for upholsterers in your area, contact local upholstery shops or the local office of the State employment service.

To receive a list of technical schools with accredited programs in upholstery, contact:

☛ Accrediting Commission of Career Schools and Colleges of Technology, 2101 Wilson Blvd., Suite 302, Arlington, VA 22201. Internet: **http://www.accsct.org**

Woodworking Occupations

(O*NET 89302A, 89302C, 89305, 89308, 89311, 89314, 89397A, 89397B, 89398, 92302, 92305, 92308, 92311, and 92314)

Significant Points

- Overall employment is projected to decline; increasing automation and imports will result in a decrease among woodworking machine operators, while demand for customized wood products will spur minimal growth among precision woodworkers.
- Job prospects will be best for highly skilled workers and those with knowledge of computer-controlled machine tool operation.
- Most woodworkers are trained on the job; basic machine operations may be learned in a few months, but becoming a skilled woodworker often requires 2 or more years.

Nature of the Work

In spite of the development of sophisticated composites and alloys, the demand for wood products continues unabated. Helping to meet this demand are production and precision woodworkers. Production woodworkers can be found in primary industries, such as sawmills and plywood mills, as well as in secondary industries that manufacture furniture, kitchen cabinets, musical instruments, and other fabricated wood products. Precision woodworkers, on the other hand, usually work in small shops that make architectural woodwork, furniture, and many other specialty items.

Production workers usually set up, operate, and tend woodworking machines—such as power saws, planers, sanders, lathes, jointers, and routers—to cut and shape components from lumber, plywood, and other wood panel products. Working from blueprints, supervisors' instructions, or shop drawings that woodworkers themselves produce, woodworkers first determine the best method of shaping and assembling parts. Before cutting, they must often measure and mark the materials. They also verify dimensions to adhere to specifications and may trim parts using handtools such as planes, chisels, wood files, or sanders to insure a tight fit. Most production woodworkers operate a specific woodworking machine, but some are responsible for a variety of machines. Lower skilled operators may merely press a switch on a woodworking machine and monitor the automatic operation, whereas more highly skilled operators set up equipment, cut and shape wooden parts, and verify dimensions using a template, caliper, or rule. In sawmills, machine operators cut logs into planks, timbers, or boards. In veneer mills, they cut veneer sheets for making plywood from logs. And in furniture plants, woodworkers make furniture components, such as table legs, drawers, rails, and spindles.

The next step in the manufacturing process is the production of subassemblies using fasteners and adhesives. The pieces are then brought together to form a complete unit. The product is then finish sanded, stained, and if necessary, coated with a sealer, such as lacquer or varnish. Woodworkers may perform this work in teams or be assisted by a helper.

All woodworkers are employed at some stage of the process through which logs of wood are transformed into finished products. Some of these workers produce the structural elements of buildings; others mill hardwood and softwood lumber; still others assemble finished wood products. They operate machines that cut, shape, assemble, and finish raw wood to make the doors, windows, cabinets, trusses, plywood, flooring, paneling, molding, and trim that are components of most homes. Others may fashion home accessories, such as beds, sofas, tables, dressers, and chairs. In addition to these household goods, woodworkers also make sporting goods, including baseball bats, racquets, and oars, as well as musical instruments, toys, caskets, tool handles, and thousands of other wooden items.

Woodworkers have been greatly affected by the introduction of computer-controlled machinery. This technology has raised worker productivity, by allowing one operator to simultaneously tend a greater number of machines. With computerized numerical controls, an operator can program a machine to perform a sequence of operations automatically, resulting in greater precision and reliability. The integration of computers with equipment has improved production speeds and capabilities, simplified setup and maintenance requirements, and increased the demand for workers with computer skills.

While this costly equipment has had a great impact on workers in the largest, most efficient firms, precision or custom woodworkers—who generally work in smaller firms—have continued to employ the same production techniques they have used for many years. These workers—